

WHAT IS CLAIMED IS:

1. A synchronous rectifier, comprising:

a transformer having a primary winding electrically connected to a power source, a secondary winding, a first auxiliary winding, and a second auxiliary winding;

a first switch and a second switch electrically connected to said secondary winding and control terminals of said first switch and said second switch individually connected to said first and second auxiliary windings for being either self-driven directly from voltages of said auxiliary windings;

a third switch electrically connected between said first switch and said first auxiliary winding in series;

a fourth switch electrically connected between said second switch and said second auxiliary winding in series;

a detecting circuit electrically connected to an output terminal of said synchronous rectifier for detecting a load status; and

a control circuit electrically connected to said detecting circuit for enabling said third switch and said fourth switch when said load status is at a heavy load and disabling said third switch and said fourth switch when said load status is at a light load.

2. The synchronous rectifier according to claim 1, wherein a drain terminal of said first switch is electrically connected to a first terminal of said transformer, a source terminal of said first switch is electrically connected to a source terminal of said second switch, and a drain terminal of said second switch is electrically connected to a second terminal of said transformer.

3. The synchronous rectifier according to claim 2, wherein one terminal of said first auxiliary winding is electrically connected to one terminal of said third

switch, and the other terminal of said first auxiliary winding is electrically connected to a source terminal of said first switch.

4. The synchronous rectifier according to claim 3, wherein one terminal of said second auxiliary winding is electrically connected to one terminal of said fourth switch, and the other terminal of said second auxiliary winding is electrically connected to a source terminal of said second switch.

5. The synchronous rectifier according to claim 4, wherein said transformer has a center-tapped winding, a center-tap of said transformer is connected to a terminal of a filtering inductor, the other terminal of said filtering inductor is electrically connected to a terminal of a filtering capacitor, the other terminal of said filtering capacitor is electrically connected to said source terminal of said first switch, and said terminals of said filtering capacitor are output terminals of said synchronous rectifier.

6. The synchronous rectifier according to claim 1, wherein said first switch further comprises a body diode.

7. The synchronous rectifier according to claim 1, wherein said second switch further comprises a body diode.

8. The synchronous rectifier according to claim 1, wherein said first switch further comprises a Schottky diode.

9. The synchronous rectifier according to claim 1, wherein said second switch further comprises a Schottky diode.

10. The synchronous rectifier according to claim 1, wherein said first switch, said second switch, said third switch, and said fourth switch are MOSFETs.

11. The synchronous rectifier according to claim 1 further comprises a DC/DC controller IC and a switching circuit electrically connected to said primary

winding of said transformer for entering and exiting burst mode when said load status is at a light load, and said third and said fourth switches are disabled.

12. A burst mode control method applied to a synchronous rectifier comprising a transformer having a primary winding electrically connected to a power source, a secondary winding, a first auxiliary winding, and a second auxiliary winding, a first switch and a second switch electrically connected to said secondary winding and control terminals of said first switch and said second switch individually connected to said first and second auxiliary windings for being either self-driven directly from voltages of said auxiliary windings, a third switch electrically connected between said first switch and said first auxiliary winding in series, and a fourth switch electrically connected between said second switch and said second auxiliary winding in series, comprising the steps of:

detecting a load status of an output terminal of said synchronous rectifier;
and

enabling said third switch and said fourth switch when said load status is at a heavy load and disabling said third switch and said fourth switch when said load status is at a light load.

13. The burst mode control method according to claim 12, wherein a drain terminal of said first switch is electrically connected to a first terminal of said transformer, a source terminal of said first switch is electrically connected to a source terminal of said second switch, and a drain terminal of said second switch is electrically connected to a second terminal of said transformer.

14. The synchronous rectifier according to claim 13, wherein one terminal of said first auxiliary winding is electrically connected to one terminal of said third

switch, and the other terminal of said first auxiliary winding is electrically connected to a source terminal of said first switch.

15. The synchronous rectifier according to claim 14, wherein one terminal of said second auxiliary winding is electrically connected to one terminal of said fourth switch, and the other terminal of said second auxiliary winding is electrically connected to a source terminal of said second switch.

16. The synchronous rectifier according to claim 15, wherein said transformer has a center-tapped winding, a center-tap of said transformer is connected to a terminal of a filtering inductor, the other terminal of said filtering inductor is electrically connected to a terminal of a filtering capacitor, the other terminal of said filtering capacitor is electrically connected to said source terminal of said first switch, and said terminals of said filtering capacitor are output terminals of said synchronous rectifier.

17. The synchronous rectifier according to claim 12, wherein said first switch and said second switch further comprise a body diode individually.

18. The synchronous rectifier according to claim 12, wherein said first switch further and said second switch comprise a Schottky diode individually.

19. The synchronous rectifier according to claim 12, wherein said first switch, said second switch, said third switch, and said fourth switch are MOSFETs.

20. The synchronous rectifier according to claim 12 further comprises a DC/DC controller IC and a switching circuit electrically connected to said primary winding of said transformer for entering and exiting burst mode when said load status is at a light load, and said third and said fourth switches are disabled.